

Economic Impact
of the
Pleasant Ridge
Wind Energy Project

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Dr. David G. Loomis is Professor of Economics at Illinois State University and Director of the Center for Renewable Energy. He has over 10 years experience in the wind industry and has performed economic analyses at the county, region, state and national levels for both wind farms and the wind turbine supply chain. He has served as a consultant for the State of Illinois, Illinois Finance Authority, Illinois State Energy Office, Invenergy, Clean Line Energy

Partners, Illinois Chamber of Commerce, Geronimo Energy and others. He has testified on the economic impacts of wind energy before the Illinois Senate Energy and Environment Committee and the LaSalle and Livingston County Boards in Illinois. Dr. Loomis is a widely recognized expert and has been quoted in the Wall Street Journal, Forbes Magazine, Associated Press, and Chicago Tribune as well as appearing on CNN.

Dr. Loomis has published over 15 peer-reviewed articles in leading energy policy and economics journals. He has raised and managed over \$5 million in grant and contracts from government, corporate and foundation sources. He received the 2011 Department of Energy's Midwestern Regional Wind Advocacy Award and the 2006 Best Wind Working Group Award. Dr. Loomis received his Ph.D. in economics from Temple University in 1995.

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I. Executive Summary



Invenergy Wind Development North America LLC is developing the Pleasant Ridge Wind Energy Project in Livingston County, Illinois. The purpose of this report is to aid decision makers in evaluating the economic impact of this project on Livingston County and the State of Illinois. The basis of this analysis is to study the direct, indirect and induced impacts on job creation, wages and total economic output.

The 243 MW Pleasant Ridge Wind Energy Project will consist of 136 wind turbines and the associated access roads, transmission and communication equipment, storage areas, and control facilities. The project represents an investment in excess of \$363 million. The proposed development is anticipated to result in the following:

Jobs

- 384 new local jobs during construction for Livingston County
- 794 new local jobs during construction for the State of Illinois
- 92 new local long term jobs for Livingston County and 137 new local long term jobs for the State of Illinois

Earnings

- Over \$24 million in new local earnings during construction for Livingston County
- Over \$50 million in new local earnings during construction for the State of Illinois
- Over \$4 million in new local long term earnings for Livingston County
- Over \$8 million in new local long term earnings for the State of Illinois

Output

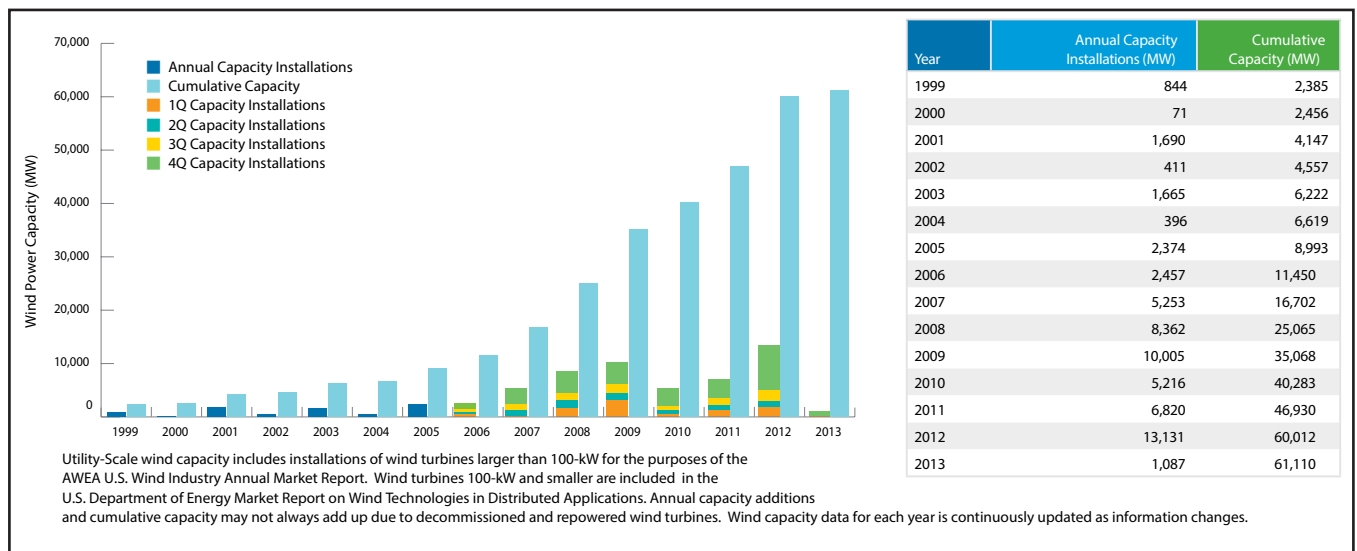
- Over \$55 million in new local output during construction for Livingston County
- Over \$95 million in new local output during construction for the State of Illinois
- Over \$20 million in new local long term output for Livingston County
- Over \$29 million for the State of Illinois in new local long term output

The U.S. wind industry grew at a rapid pace from 2006-2012. In 2012, the U.S. set a new record of 13,131 MW far surpassing the previous annual peak just over 10,000 MW of wind power installed in 2009. Due to the uncertainty surrounding wind energy policy, the industry only installed 1,087 MW in 2013. The total amount of wind capacity in the U.S. by the end of 2013 was 61,110 MW which is enough to power the equivalent of over 15.5 million homes. China is the global leader with 91.4 GW of installed capacity with Germany in third place with 34 GW of installed capacity. Figure 1 shows the growth in installed annual capacity and cumulative capacity in the U.S. and Figure 2 shows the state-by-state breakdown of installed capacity.

II. U.S. Wind Industry Growth and Economic Development

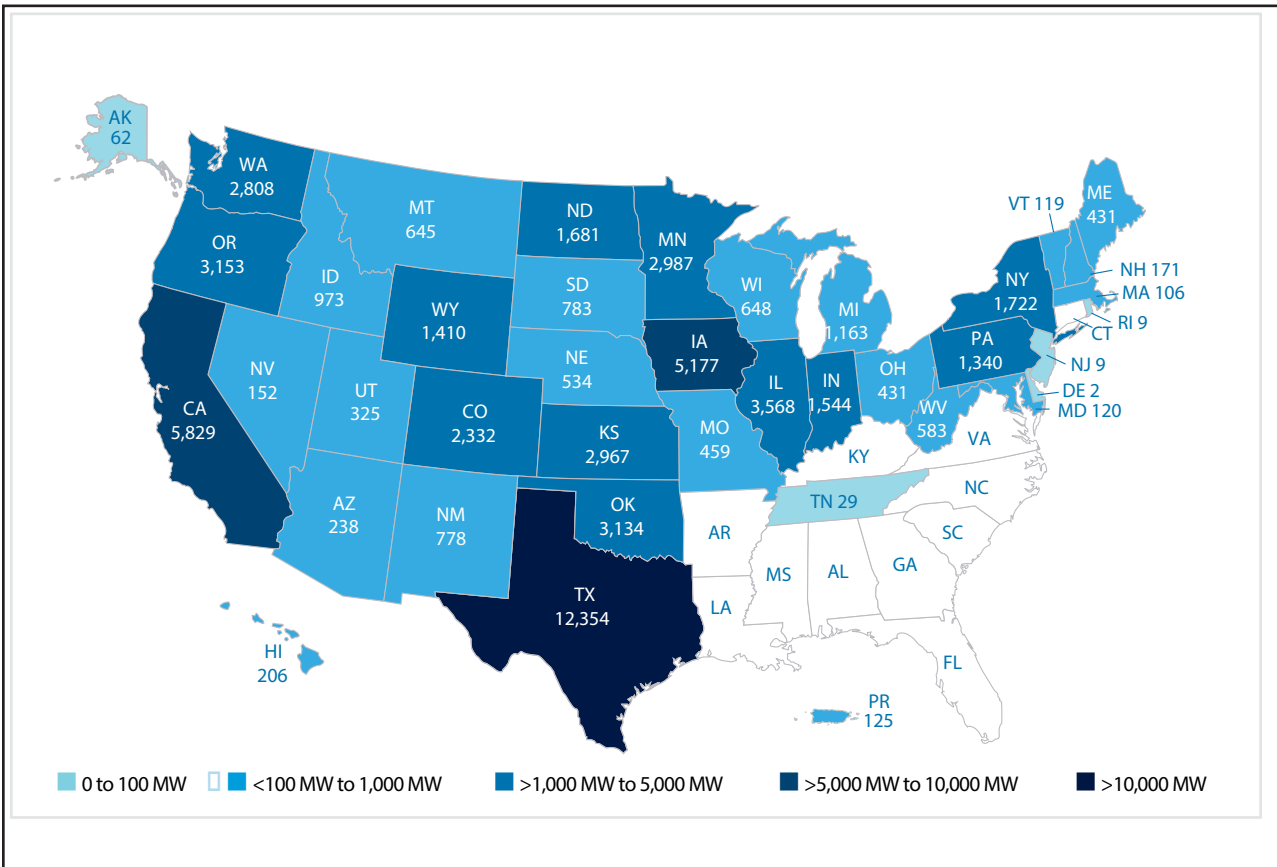
a. U.S. Wind Industry Growth

Figure 1.—U.S. Annual and Cumulative Wind Power Capacity Growth (Utility-Scale Wind)



Source: American Wind Energy Association, U.S. Wind Industry Annual Market Report, Year Ending 2013

Figure 2.—Total Wind Capacity by State



Source: American Wind Energy Association, U.S. Wind Industry Annual Market Report, Year Ending 2013

b. Illinois Wind Industry Growth

Illinois' wind power capacity has grown from 50 MW in 2003 to 3,568 MW in 2013. As of December, 2012, Illinois ranked 4th in the United States in existing wind-powered generating capacity and ranked 16th in the United States in potential capacity (AWEA, 2010b; AWEA, 2014). Table 1 has a list of the operational wind farms in Illinois. Illinois has 23 wind farms greater than 50 MW covering parts of 17 different counties.

Table 1. — Illinois Wind Farm Projects over 50 MW

Wind Farm	Location (County)	Capacity (MW)
Streator Cayuga Ridge South Wind Farm	Livingston	300.0
Big Sky Wind Farm	Bureau and Lee	239.4
Lee-DeKalb Wind Energy Center	DeKalb and Lee	217.5
California Ridge	Champaign and Vermillion	214.0
Bishop Hill I	Henry	209.4
Top Crop Wind Farm Phase II	Grundy	198.0
Twin Groves Wind Farm Phase I	McLean	198.0
Twin Groves Wind Farm Phase II	McLean	198.0
Pioneer Trail	Iroquois and Ford	150.0
Settlers Trail	Iroquois	150.0
Camp Grove Wind Farm	Marshall and Stark	150.0
White Oak Energy Center	McLean	150.0
Grand Ridge Energy Center Expansion	LaSalle	111.0
Shady Oaks	Lee	109.5
Top Crop Wind Farm Phase I	LaSalle	102.0
EcoGrove Wind Farm	Stephenson	100.5
Railsplitter Wind Farm	Logan and Tazewell	100.5
Grand Ridge Energy Center Phase I	LaSalle	99.0
Bishop Hill II	Henry	80.0
GSG Wind Farm	Lee and LaSalle	80.0
Providence Heights Wind Farm	Bureau	72.0
Crescent Ridge Wind Farm	Bureau	54.4
Mendota Hills	Lee	51.7

c. Economic Benefits of Wind Farms



Wind farms have numerous economic benefits. Wind farms create job opportunities in the local area during both the short-term construction phase and the long-term operational phase. Lease payments made to landowners provide a steady source of long-term income to offset the fluctuating prices received from crops. Wind farms strengthen the local tax base helping to improve county services, schools, police and fire departments and infrastructure improvements, such as public roads.

Numerous studies have quantified the economic benefits across the United States (see http://apps2.eere.energy.gov/wind/windexchange/economics_tools.asp). The National Renewable Energy Laboratory has produced economic impact reports for the State of Arizona (NREL, 2008a), State of Idaho (NREL, 2008b), State of Indiana (NREL, 2014), State of Iowa (NREL, 2013), State of Maine (NREL, 2008c), State of Montana (NREL, 2008d), State of New Mexico (NREL, 2008e), State of Nevada (NREL, 2008f), State of Pennsylvania (NREL, 2008g), State of South Dakota (NREL, 2008h), State of Utah (NREL 2008i), State of West Virginia (NREL, 2008j), State of Wisconsin (NREL, 2008k), and the State of North Carolina (NREL, 2009).

More locally, two reports recently released by the Center for Renewable Energy have examined the economic impact of Illinois wind farms and the economic impact of the related wind turbine supply chain in Illinois (see <http://renewableenergy.illinoisstate.edu/wind/pubs.shtml>). According to the Economic Impact: Wind Energy Development in Illinois (June 2012), “the 23 largest wind farms in Illinois:

- Created approximately 19,047 full-time equivalent jobs during construction periods with a total payroll of over \$1.1 billion
- Support approximately 814 permanent jobs in rural Illinois areas with a total annual payroll of nearly \$48 million
- Support local economies by generating \$28.5 million in annual property taxes
- Generate \$13 million annually in extra income for Illinois landowners who lease their land to the wind farm developer
- Will generate a total economic benefit of \$5.98 billion over the life of the projects.”

According to the Illinois Wind Turbine Supply Chain Report (June 2010), “if all of the new wind turbine capacity that is predicted to be installed in Illinois over the 2011-2015 time period were to be produced in Illinois, we estimate that between 15.8 and 16.8 thousand additional jobs would be created. Income would increase by between \$1.04 and \$1.08 billion, while total output would increase by approximately \$3.9 billion.”

The Pleasant Ridge Wind Energy Project is a 243 megawatt wind farm under development in Livingston County, Illinois. The Project is located in Livingston County southeast of the town of Pontiac, Illinois and encompasses an area of approximately 58,300 acres within the townships of Pleasant Ridge, Forrest, Fayette, Eppards Point, Indian Grove, Chatsworth, Charlotte, Belle Prairie and Avoca. Approximately 36,400 acres of land are under contract with land owners to host Project facilities. The area was selected based on wind resources, land use and proximity to existing transmission infrastructure.

The Pleasant Ridge Wind Energy Project will consist of up to 136 GE 1.79-100, or similar model turbines, generating up to 250 megawatts (MW) of power. Associated facilities include graveled roads to access each turbine and above and below surface electrical cabling to collect and transmit the power to a Project substation as well as a generator tie line to a Commonwealth Edison substation. Pleasant Ridge anticipates that the Project could begin commercial operation as early as fall of 2015 pending completion of permitting, power off-take agreements, agency approvals, and other development activities.

III. Pleasant Ridge Wind Energy Project Description and Location

a. Pleasant Ridge Wind Energy Project Description



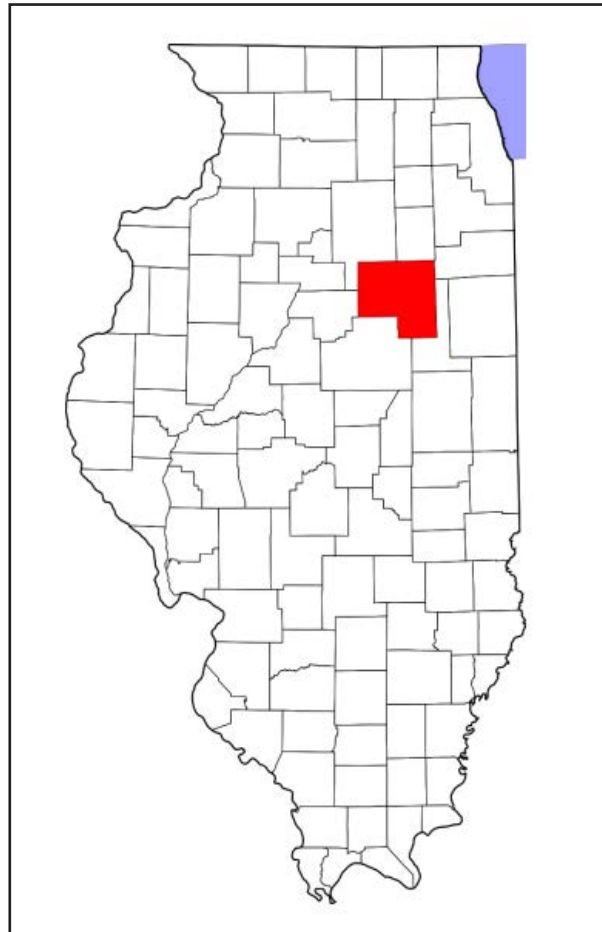
b. Livingston County, Illinois

Livingston County is located in the upper portion of Central Illinois (see Figure 3). It has a total area of 1,044 square miles and the U.S. Census estimates that the 2010 population was 38,950 with a population density of 37.3 (persons per square mile) compared to 231 for the State of Illinois. Median household income in the county was \$54,339 (2008-2012). The largest industry providing employment is manufacturing (27.6%) followed by health care and social assistance (17.6%), retail trade (14.0%), accommodation and food services (7.6%), and other services (6.6%).

Pontiac is the largest municipality within Livingston County with a population of 11,931 followed by Dwight with 4,260 and Fairbury with 3,757. RR Donnelley is the largest employer in Livingston County with 800 workers followed by Caterpillar with 550 and OSF Saint James Hospital with 483.

Livingston County is home to a 460-acre landfill site that receives over 4,000 tons of waste a day. The revenue that Livingston County has received from the landfill has declined over time. In 2003, the County received \$9.384 million. By 2009, the revenue was only \$2.99 million. In 2009 and 2010, the landfill revenue rebounded to approximately \$4 million per year.

Figure 3.—Map of Livingston County, Illinois



IV. Methodology



NREL: National Renewable Energy Laboratory

JEDI: Jobs and Economic Development Impacts

IMPLAN: Impact Analysis for PLANning

The economic analysis of wind power development presented here utilizes the National Renewable Energy Laboratory's (NREL's) latest Jobs and Economic Development Impacts (JEDI) Wind Energy Model (W4.28.14). NREL is the U.S. Department of Energy's primary national laboratory for renewable energy and energy efficiency research and development. The JEDI Wind Energy Model is an input-output model that measures the spending patterns and location-specific economic structures that reflect expenditures supporting varying levels of employment, income, and output. Essentially, JEDI is an input-output model, which takes into account the fact that the output of one industry can be used as an input for another. For example, when a wind farm developer purchases turbines to build a wind farm, those wind turbines are made of components such as fiberglass, aluminum, steel, copper, etcetera. Therefore, purchases of wind turbines impact the demand for these components. In addition, when a wind farm developer purchases a wind turbine from a manufacturing facility, the manufacturer uses some of that money to pay employees, and then the employees spend that money to purchase goods and services within their community. In essence, JEDI reveals how purchases of wind project materials not only benefit local turbine manufacturers but also the local industries that supply the concrete, rebar, and other materials (Reategui et al., 2009). The JEDI model uses construction cost data, operating cost data, and data relating to the percentage of goods and services acquired in the state to calculate jobs, earnings, and economic activities that are associated with this information. The results are broken down into the construction period and the operation period of the wind project. Within each period, impacts are further divided into direct, turbine and supply chain (indirect), and induced impacts.

The Jobs and Economic Development Impacts (JEDI) Model was developed in 2002 to demonstrate the economic benefits associated with developing wind farms in the United States. The model was developed by Marshall Goldberg of MRG & Associates, under contract with the National Renewable Energy Laboratory. The JEDI model utilizes state specific industry multipliers obtained from IMPLAN (Impact Analysis for PLANning). IMPLAN software and data are managed and updated by the Minnesota IMPLAN Group, Inc., using data collected at federal, state, and local levels. The JEDI model considers 14 aggregated industries that are impacted by the construction and operation of a wind farm: agriculture, construction, electrical equipment, fabricated metals, finance/insurance/real estate, government, machinery, mining, other manufacturing, other services, professional service, retail trade, transportation/communication/public utilities, and wholesale trade (Reategui et al., 2009). This study does not analyze net jobs. It analyzes the gross jobs that the new wind farm development supports.



Direct impacts during the construction period refer to the changes that occur in the onsite construction industries in which the direct final demand (i.e., spending on construction labor and services) change is made. Final demands are goods and services purchased for their ultimate use by the end user. Onsite construction-related services include engineering, design, and other professional services. Direct impacts during operating years refer to the final demand changes that occur in the onsite spending for wind farm workers. Direct jobs consist primarily of onsite construction and project development labor. The initial spending on the construction and operation of the wind farm creates a second layer of impacts, referred to as “turbine and supply chain impacts” or “indirect impacts.” Indirect impacts during the construction period consist of the changes in inter-industry purchases resulting from the direct final demand changes, and include construction spending on materials and wind farm equipment and other purchases of goods and offsite services. Essentially, these impacts result from “spending related to project development and on-site labor such as equipment costs (turbines, blades, towers, transportation), manufacturing of components and supply chain inputs, materials (transformer, electrical, HV line extension, HV subinterconnection materials), and the supply chain of inputs required to produce these materials” (JEDI Support Team, 2009, 2). Concrete that is used in turbine foundations increases the demand for gravel, sand, and cement. As a result of the expenditure for concrete there is increased economic activity at quarries and cement factories and these changes are indirect impacts. The accountant for the construction firm and the banker who finances the contractor are both considered indirect impacts. All supply chain component impacts/manufacturing-related activities are included under indirect impacts; therefore, the late stage turbine assembly process, which includes gearbox assembly, blade production, and steel rolling are all included under the construction period indirect impacts category.

Indirect impacts during operating years refer to the changes in inter-industry purchases resulting from the direct final demand changes. Essentially, these impacts result from “expenditures related to on-site labor, materials, and services needed to operate the wind farms (e.g., vehicles, site maintenance, fees, permits, licenses, utilities, insurance, fuel, tools and supplies, replacement parts/equipment); the supply chain of inputs required to produce these goods and services; and project revenues that flow to the local economy in the form of land lease revenue, property tax revenue, and revenue to equity investors” (JEDI Support Team, 2009, 3). All land lease payments and property taxes show up in the operating-years portion of the results because these payments do not support the day-to-day operations and maintenance of the wind farm but instead are more of a latent effect that results from the wind farm being present (Eric Lantz, February 25, 2009, e-mail message to Jennifer Hinman).

Induced impacts during construction refer to the changes that occur in household spending as household income increases or decreases due to the direct and indirect effects of final demand changes. Local spending by employees working directly or indirectly on the wind farm project who receive their paychecks and then spend money in the community is included. Additional local jobs and economic activity are supported by these purchases of goods and services. Thus, for example, the increased economic activity at quarries and cement factories results in increased revenues for the affected firms and raises individual incomes. Individuals employed by these companies then spend more money in the local economy, e.g., as workers receive income, they may decide to purchase more expensive clothes, or higher quality food along with other goods and services from local businesses. This increased economic activity may result from “construction workers who spend a portion of their income on lodging, groceries, clothing, medicine, a local movie” theater, restaurant, or bowling alley; or a “steel mill worker who provides the inputs for turbine production and spends his money in a similar fashion, thus supporting jobs and economic activities in different sectors of the economy” (JEDI Support Team, 2009, 2). Induced impacts during operating years refer to the changes that occur in household spending as household income increases or decreases as a result of the direct and indirect effects from final demand changes. Some examples include a “wind farm technician who spends income from working at the wind farm on buying a car, a house, groceries, gasoline,” or movie tickets; or a “worker at a hardware store who provides spare parts and materials needed at the wind farm and who spends money in a similar fashion, thus supporting jobs and economic activities in different sectors of the economy” (JEDI Support Team, 2009, 3).

This methodology was been validated by a paper in the peer-reviewed economics literature. In the article, “Ex Post Analysis of Economics Impacts from Wind Power Development in U. S. Counties,” the authors conduct an ex post econometric analysis of the county-level economic development impacts of wind power installations from 2000 through 2008. They find an aggregate increase in county-level personal income and employment of approximately \$11,000 and 0.5 jobs per megawatt of wind power capacity which is consistent with the JEDI results at the county level. (Brown, 2012)



V. Results



The results were derived from detailed cost estimates supplied by Invenergy. In addition, Invenergy also estimated the percentages of project materials and labor that will be coming from within Livingston County and the State of Illinois.

Two separate JEDI models were run to show the economic impact of the Pleasant Ridge Wind Energy Project. The first JEDI model used the 2012 Livingston County multipliers from IMPLAN. The second JEDI model used the built-in JEDI state multipliers for the State of Illinois and the same project costs.

The output from these two models is shown in Tables 2-4. Table 2 lists the total employment impact from the Pleasant Ridge Wind Energy Project for the county and for the State of Illinois. Table 3 shows the impact on total earnings and Table 4 contains the impact on total output.

Table 2. — Total Employment Impact from the Pleasant Ridge Wind Energy Project

	Livingston County	State of Illinois
Construction		
Project Development and Onsite Labor Impacts	177	293
Turbine and Supply Chain Impacts	173	350
Induced Impacts	34	151
<i>New Local Jobs during Construction</i>	384	794
Operations		
Onsite Labor Impacts	13	13
Local Revenue and Supply Chain Impacts	56	71
Induced Impacts	23	53
<i>New Local Long Term Jobs</i>	92	137

The results from the JEDI model show significant employment impacts from the Pleasant Ridge Wind Energy Project. Employment impacts can be broken down into several different components. Direct jobs created during the construction phase typically last anywhere from 6 months to over a year depending on the size of the project; however, the direct job numbers present in Table 2 from the JEDI model are based on a full time equivalent (FTE) basis for a year. In other words, 1 job = 1 FTE = 2,080 hours worked in a year. A part time or temporary job would constitute only a fraction of a job according to the JEDI model. For example, the JEDI model results show 384 new jobs during construction in Livingston County, though the construction of the wind farms may actually involve hiring closer to 768 workers for 6 months. Thus, due to the short-term nature of construction projects, the JEDI model significantly understates the number of people actually hired to work on the project. It is important to keep this fact in mind when looking at the numbers or when reporting the numbers.

As shown in Table 2, new local jobs created or retained during construction total 384 for Livingston County and 794 for the State of Illinois. New local long term jobs created from the Pleasant Ridge Wind Energy Project total 92 for Livingston County and 137 for the State of Illinois.

Direct jobs created during the operational phase last the life of the wind farm, typically 20-30 years. Direct construction jobs and operations and maintenance jobs both require highly-skilled workers in the fields of construction, management, and engineering. These well-paid professionals boost economic development in rural communities where new employment opportunities are welcome due to economic downturns (Reategui and Tegen, 2008). Accordingly, it is important to not just look at the number of jobs but also the earnings that they produce. The earnings impacts from the Pleasant Ridge Wind Energy Project are shown in Table 3 and are categorized by construction impacts and operations impacts. The new local earnings during construction total over \$24.0 million for Livingston County. The new local earnings are over \$50.6 million for the State of Illinois. The new local long term earnings total over \$4.0 million for Livingston County and over \$8.6 million for the State of Illinois.



Table 3. — Total Earnings Impact from the Pleasant Ridge Wind Energy Project

	Livingston County	State of Illinois
Construction		
Project Development and Onsite Earnings Impacts	\$14,225,724	\$22,587,945
Turbine and Supply Chain Impacts	\$8,621,857	\$19,107,481
Induced Impacts	\$1,192,681	\$8,942,938
<i>New Local Earnings during Construction</i>	\$24,040,262	\$50,638,365
Operations		
Onsite Labor Impacts	\$992,775	\$992,775
Local Revenue and Supply Chain Impacts	\$2,213,887	\$4,381,792
Induced Impacts	\$835,483	\$3,277,260
<i>New Local Long Term Earnings</i>	\$4,042,145	\$8,651,827

Output refers to economic activity or the value of production in the state or local economy. According to Table 4, the new local output during construction totals over \$55 million for Livingston County. This figure increases to over \$95 million for the State of Illinois. The new local long term output totals over \$20 million for Livingston County and over \$29.4 million for the State of Illinois.

Table 4. — Total Output Impact from the Pleasant Ridge Wind Energy Project

	Livingston County	State of Illinois
Construction		
Project Development and Onsite Jobs Impacts on Output	\$15,179,929	\$23,122,217
Turbine and Supply Chain Impacts	\$36,192,872	\$47,284,227
Induced Impacts	\$4,330,233	\$24,624,855
<i>New Local Output during Construction</i>	\$55,703,034	\$95,031,298
Operations (Annual)		
Onsite Labor Impacts	\$992,775	\$992,775
Local Revenue and Supply Chain Impacts	\$16,068,530	\$19,417,277
Induced Impacts	\$3,033,528	\$9,024,953
<i>New Local Long Term Output</i>	\$20,094,833	\$29,435,006

Landowners benefit when they lease their land to wind developers because of the stabilized income stream. According to the model's results, the Pleasant Ridge Wind Energy Project will generate more than \$900,000 annually in extra income for Illinois landowners who lease their land for the project.

Wind power projects increase the property tax base of a county, creating a new revenue source for education and other local government services. According to Public Act 095-0644, the fair cash value for a utility-scale wind turbine in Illinois is \$360,000 per Megawatt of capacity beginning in 2007 and is annually adjusted for inflation and depreciation. The inflation adjustment, as known as the Trending Factor, increases each year according to the Bureau of Labor Statistics' Consumer Price Index for all cities for all items. The depreciation allowed is 4% per year up to a maximum depreciation of 70%. In April 2010, the Illinois legislature extended Public Act 095-0644, which was set to expire at the end of 2011, until 2016. If this law were allowed to expire in the future, the determination of the equalized assessed value of the wind farm would revert back to the county assessor's office.

Table 5 details the tax implications of the Pleasant Ridge Wind Energy Project. There are several important assumptions built into the analysis in this table. First, the analysis assumes that the valuation of the wind farm is assessed the same as set forth in Public Act 095-0644. Second, the table assumes future inflation is constant at 2.2% and the depreciation is 4% until it reaches the maximum of 70%. Third, the projections assume a constant overall tax rate of 9.3471% and a constant school district tax rate of 4.8215%. Fourth, the analysis assumes that the wind farm is placed in service on January 1, 2016 at a fair cash value of \$106,343,976 according to Public Act 095-0644. Fifth, it assumes that the wind farm is decommissioned in 20 years and pays no more taxes. Sixth, the reduction in state aid assumes no changes in the school funding formula or the foundation level determined by the state.

According to Table 5, the total taxes paid by the wind farm starts out at over \$3.3 million but declines due to depreciation (and offset by the trending factor) until it reaches the bottom in 2034. After that, the wind farm is fully depreciated and the trending factor causes the taxable value and taxes to increase. The Prairie Central School District will receive a large portion of those additional taxes as shown in Table 5.

The Center for Renewable Energy did a report titled Wind Farm Implications for School District Revenue which details how a wind farm affects the local school district's revenue. Although the school district collects increased local property tax revenue from the wind farm, it receives less from General State Aid because of the increases in Equalized Assessed Value (EAV) due to the wind farm. Table 5 calculates the reduction in General State Aid and the net school revenue after adjusting for the loss in state aid. Because the state uses the previous year's EAV, the school district gets "extra" revenue in its first year. This will be partially offset in the year after the wind farm is decommissioned because the state is using an old EAV that had the wind farm on the books. Overall, the school district will receive an average annual increase of \$441,053 due to the Pleasant Ridge Wind Energy Project.



Table 5. — Tax Implications of the Pleasant Ridge Wind Energy Project

Year	Taxable Value of Wind Farm	Total Taxes	School Taxes	Reduction in State Aid	Net School Revenue
2016	\$35,447,992	\$3,313,367	\$1,709,132	0	\$1,709,132
2017	\$34,778,734	\$3,250,811	\$1,676,864	\$1,063,440	\$613,424
2018	\$34,062,871	\$3,183,898	\$1,642,348	\$1,043,362	\$598,986
2019	\$33,298,678	\$3,112,468	\$1,605,502	\$1,021,886	\$583,616
2020	\$32,484,374	\$3,036,354	\$1,566,241	\$998,960	\$567,280
2021	\$31,618,124	\$2,955,385	\$1,524,474	\$974,531	\$549,943
2022	\$30,698,037	\$2,869,383	\$1,480,112	\$948,544	\$531,568
2023	\$29,722,162	\$2,778,167	\$1,433,060	\$920,941	\$512,119
2024	\$28,688,492	\$2,681,548	\$1,383,221	\$891,665	\$491,556
2025	\$27,594,954	\$2,579,334	\$1,330,496	\$860,655	\$469,841
2026	\$26,439,415	\$2,471,324	\$1,274,782	\$827,849	\$446,933
2027	\$25,219,677	\$2,357,314	\$1,215,972	\$793,182	\$422,789
2028	\$23,933,473	\$2,237,091	\$1,153,957	\$756,590	\$397,367
2029	\$22,578,471	\$2,110,437	\$1,088,625	\$718,004	\$370,621
2030	\$21,152,264	\$1,977,128	\$1,019,861	\$677,354	\$342,507
2031	\$19,652,376	\$1,836,932	\$947,543	\$634,568	\$312,975
2032	\$18,076,255	\$1,689,610	\$871,550	\$589,571	\$281,979
2033	\$16,421,274	\$1,534,916	\$791,755	\$542,288	\$249,467
2034	\$15,733,633	\$1,470,642	\$758,600	\$492,638	\$265,962
2035	\$16,079,773	\$1,502,996	\$775,289	\$472,009	\$303,280
2036	\$16,433,528	\$1,536,062	\$792,346	\$482,393	\$309,953
2037	\$16,795,066	\$1,569,855	\$809,777	\$493,006	\$316,772
2038	\$0	\$0	\$0	\$503,852	-\$503,852

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National Renewable Energy Laboratory (NREL), 2008b. Economic Benefits, Carbon Dioxide (CO₂) Emissions Reductions, and Water Conservation Benefits from 1,000 Megawatts (MW) of New Wind Power in Idaho. Technical Report DOE/GO-102008-2671, October 2008. NREL, Golden, CO. Available at <<http://www.nrel.gov/docs/fy09osti/44145.pdf>>.

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National Renewable Energy Laboratory (NREL), 2008g. Economic Benefits, Carbon Dioxide (CO₂) Emissions Reductions, and Water Conservation Benefits from 1,000 Megawatts (MW) of New Wind Power in Pennsylvania. Technical Report DOE/GO-102008-2680, October 2008. NREL, Golden, CO. Available at <<http://www.nrel.gov/docs/fy09osti/44274.pdf>>.

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Reategui, S., Tegen, S., 2008. Economic Development Impacts of Colorado's First 1,000 Megawatts of Wind Energy. NREL/CP-500-43505. Presented at WINDPOWER 2008.

Reategui, S., Stafford, E.R., Hartman, C.L., Huntsman, J.M., 2009. Generating Economic Development from a Wind Power Project in Spanish Fork Canyon, Utah: A Case Study and Analysis of State-Level Economic Impacts. DOE/GO-102009-2760. January 2009. Available at <http://www.windpoweringamerica.gov/pdfs/economic_development/2009/ut_spanish_fork.pdf>.

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VII. Curriculum Vita - David Loomis

Education

Doctor of Philosophy, Economics, Temple University, Philadelphia, Pennsylvania, May 1995.

Bachelor of Arts, Mathematics and Honors Economics, Temple University, Magna Cum Laude, May 1985.

Experience

1996-present Illinois State University, Normal, IL

Full Professor – Department of Economics (2010-present)

Associate Professor - Department of Economics (2002-2009)

Assistant Professor - Department of Economics (1996-2002)

- Taught Regulatory Economics, Telecommunications Economics and Public Policy, Industrial Organization and Pricing, Individual and Social Choice, Economics of Energy and Public Policy and a Graduate Seminar Course in Electricity, Natural Gas and Telecommunications Issues.
- Supervised as many as 5 graduate students in research projects each semester.
- Served on numerous departmental committees.

1997-present Institute for Regulatory Policy Studies, Normal, IL

Executive Director (2005-present)

Co-Director (1997-2005)

- Grew contributing membership from 5 companies to 16 organizations.
- Doubled the number of workshop/training events annually.
- Supervised 2 Directors, Administrative Staff and internship program.
- Developed and implemented state-level workshops concerning regulatory issues related to the electric, natural gas, and telecommunications industries.

Experience (cont'd)

2006-present Illinois Wind Working Group, Normal, IL

Director

- Founded the organization and grew the organizing committee to over 150 key wind stakeholders
- Organized annual wind energy conference with over 400 attendees
- Organized strategic conferences to address critical wind energy issues
- Initiated monthly conference calls to stakeholders
- Devised organizational structure and bylaws
- Established and taught monthly Landowner Forums throughout the state..

2007-present Center for Renewable Energy, Normal, IL

Director

- Created founding document approved by the State University Board of Trustees and Illinois Board of Higher Education.
- Secured over \$150,000 in funding from private companies.
- Hired and supervised 4 professional staff members and supervised 2 faculty members as Associate Directors.
- Reviewed renewable energy manufacturing grant applications for Illinois Department of Commerce and Economic Opportunity for a \$30 million program.
- Created technical “Due Diligence” documents for the Illinois Finance Authority loan program for wind farm projects in Illinois.

1997-2002 International Communications Forecasting Conference Chair

- Expanded Planning Committee with representatives from over 18 different international companies and delivered high quality conference attracting over 500 people over 4 years.

1985-1996 Bell Atlantic, Philadelphia, Pa.

Economist - Business Research

- Wrote and taught Applied Business Forecasting multimedia course.
- Developed and documented 25 econometric demand models that were used in regulatory filings.
- Provided statistical and analytic support to regulatory costing studies.
- Served as subject matter expert in switched and special access.
- Administered \$4 million budget including \$1.8 million consulting budget.

Professional Awards and Memberships

2011 Midwestern Regional Wind Advocacy Award from the Department of Energy's Wind Powering America presented at WindPower 2011

2009 Economics Department Scott M. Elliott Faculty Excellence Award – awarded to faculty who demonstrate excellence in teaching, research and service.

2008 Outstanding State Wind Working Group Award from the Department of Energy's Wind Power America presented at WindPower 2008.

2009 Illinois State University Million Dollar Club – awarded to faculty who have over \$1 million in grants through the university.

1999 Illinois State University Teaching Initiative Award

Member of the American Economic Association, National Association of Business Economists, International Association for Energy Economics, Institute for Business Forecasters; Institute for International Forecasters, International Telecommunications Society.

Professional Publications

Chupp, B. A., Hickey, E.A. & Loomis, D. G. (2012). Optimal Wind Portfolios in Illinois. *Electricity Journal*, 25, 46-56.

Hickey, E., Loomis, D. G., & Mohammadi, H. (2012). Forecasting hourly electricity prices using ARMAX-GARCH models: An Application to MISO hubs. *Energy Economics*, 34, 307-315.

Theron, S., Winter, J.R, Loomis, D. G., & Spaulding, A. D. (2011). Attitudes Concerning Wind Energy in Central Illinois. *Journal of the America Society of Farm Managers and Rural Appraisers*, 74, 120-128.

Payne, J. E., Loomis, D. G. & Wilson, R. (2011). Residential Natural Gas Demand in Illinois: Evidence from the ARDL Bounds Testing Approach. *Journal of Regional Analysis and Policy*, 41(2), 138.

Loomis, D. G. & Ohler, A. O. (2010). Are Renewable Portfolio Standards A Policy Cure-all? A Case Study of Illinois's Experience. *Environmental Law and Policy Review*, 35, 135-182.

Gil-Alana, L. A., Loomis, D. G., & Payne, J. E. (2010). Does energy consumption by the U.S. electric power sector exhibit long memory behavior ? *Energy Policy*, 38, 7512-7518.

Professional Publications (cont'd)

- Carlson, J. L., Payne, J. E., & Loomis, D. G. (2010). An assessment of the Economic Impact of the Wind Turbine Supply Chain in Illinois. *Electricity Journal*, 13, 75-93.
- Apergis, N., Payne, J. E., & Loomis, D. G. (2010). Are shocks to natural gas consumption transitory or permanent? *Energy Policy*, 38, 4734-4736.
- Apergis, N., Payne, J. E., & Loomis, D. G. (2010). Are fluctuations in coal consumption transitory or permanent? Evidence from a panel of U.S. states. *Applied Energy*, 87, 2424-2426.
- Hickey, E. A., Carlson, J. L., & Loomis, D. G. (2010). Issues in the determination of the optimal portfolio of electricity supply options. *Energy Policy*, 38, 2198-2207.
- Carlson, J. L., & Loomis, D. G. (2008). An assessment of the impact of deregulation on the relative price of electricity in Illinois. *Electricity Journal*, 21, 60-70.
- Loomis, D. G., (2008). The telecommunications industry. In H. Bidgoli (Ed.), *The handbook of computer networks* (pp. 3-19). Hoboken, NJ: John Wiley & Sons.
- Cox, J. E., Jr., & Loomis, D. G. (2007). A managerial approach to using error measures in the evaluation of forecasting methods. *International Journal of Business Research*, 7, 143-149.
- Cox, J. E., Jr., & Loomis, D. G. (2006). Improving forecasting through textbooks – a 25 year review. *International Journal of Forecasting*, 22, 617-624.
- Swann, C. M., & Loomis, D. G. (2005). Competition in local telecommunications – there's more than you think. *Business Economics*, 40, 18-28.
- Swann, C. M., & Loomis, D. G. (2005). Intermodal competition in local telecommunications markets. *Information Economics and Policy*, 17, 97-113.
- Swann, C. M., & Loomis, D. G. (2004) Telecommunications demand forecasting with intermodal competition – a multi-equation modeling approach. *Telektronikk*, 100, 180-184.
- Cox, J. E., Jr., & Loomis, D. G. (2003). Principles for teaching economic forecasting. *International Review of Economics Education*, 1, 69-79.

Professional Publications (cont'd)

- Taylor, L. D. & Loomis, D. G. (2002). *Forecasting the internet: understanding the explosive growth of data communications*. Boston: Kluwer Academic Publishers.
- Wiedman, J. & Loomis, D. G. (2002). U.S. broadband pricing and alternatives for internet service providers. In D. G. Loomis & L. D. Taylor (Eds.) Boston: Kluwer Academic Publishers.
- Cox, J. E., Jr. & Loomis, D. G. (2001). Diffusion of forecasting principles: an assessment of books relevant to forecasting. In J. S. Armstrong (Ed.), *Principles of Forecasting: A Handbook for Researchers and Practitioners* (pp. 663-650). Norwell, MA: Kluwer Academic Publishers.
- Cox, J. E., Jr. & Loomis, D. G. (2000). A course in economic forecasting: rationale and content. *Journal of Economics Education*, 31, 349-357.
- Malm, E. & Loomis, D. G. (1999). Active market share: measuring competitiveness in retail energy markets. *Utilities Policy*, 8, 213-221.
- Loomis, D. G. (1999). Forecasting of new products and the impact of competition. In D. G. Loomis & L. D. Taylor (Eds.), *The future of the telecommunications industry: forecasting and demand analysis*. Boston: Kluwer Academic Publishers.
- Loomis, D. G. (1997). Strategic substitutes and strategic complements with interdependent demands. *The Review of Industrial Organization*, 12, 781-791.

Grants

- “Wind for Schools Education and Outreach,” with Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 11-025001, March 2010, \$190,818.
- “Using Informal Science Education to Increase Public Knowledge of Wind Energy in Illinois,” with Amy Bloom and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February 2011, \$13,713.
- “Wind Turbine Market Research,” with Matt Aldeman, Illinois Manufacturers Extension Center, May, 2010, \$4,000.
- “Petco Resource Assessment,” with Matt Aldeman, Petco Petroleum Co., April, 2010, \$18,000.
- “Wind for Schools Education and Outreach,” with Anthony Lornbach and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February, 2010, \$13,635.

Grants (cont'd)

“Wind for Schools Education and Outreach,” with Anthony Lornbach and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February, 2010, \$13,635.

“IGA IFA/ISU Wind Due Diligence,” Illinois Finance Authority, November, 2009, \$8,580 amended 12/09; original amount \$2,860.

“Distance Learning Technology Program,” Illinois State University Faculty Technology Support Services, Summer 2002, \$3,000.

“Green Industry Business Development Program, with the Shaw Group and Illinois Manufacturers Extension Center, Illinois Department of Commerce and Economic Opportunity, Award Number 09-021007, August 2009, \$245,000.

“Wind Turbine Workshop Support,” Illinois Department of Commerce and Economic Opportunity, June 2009, \$14,900

“Illinois Wind Workers Group,” with Randy Winter, U.S. Department of Energy, Award Number DE-EE0000507, 2009-2010, \$99,941.

“Wind Turbine Supply Chain Study,” with J. Lon Carlson and James E. Payne, Illinois Department of Commerce and Economic Opportunity, Award Number 09-021003, April 2009, \$125,000.

“Renewable Energy Team Travel to American Wind Energy Association WindPower 2009 Conference, Center for Mathematics, Science and Technology, February 2009, \$3,005.

“Renewable Energy Educational Lab Equipment,” with Randy Winter and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), February, 2008, \$232,600.

Proposal for New Certificate Program in Electricity, Natural Gas and Telecommunications Economics,” with James E. Payne, Extended Learning Program Grant, April, 2007, \$29,600.

“Illinois Broadband Mapping Study,” with J. Lon Carlson and Rajeev Goel, Illinois Department of Commerce and Economic Opportunity, Award Number 06-205008, 2006-2007, \$75,000.

“Illinois Wind Energy Education and Outreach Project,” with David Kennell and Randy Winter, U.S. Department of Energy, Award Number DE-FG36-06GO86091, 2006-2010, \$990,000.

“Wind Turbine Installation at Illinois State University Farm,” with Doug Kingman and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), May, 2004, \$500,000.

Grants (cont'd)

“Illinois State University Wind Measurement Project,” Doug Kingman and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), with August, 2003, \$40,000.

“Illinois State University Wind Measurement Project,” with Doug Kingman and David Kennell, NEG Micon matching contribution, August, 2003, \$65,000.

“Distance Learning Technology Program,” Illinois State University Faculty Technology Support Services, Summer 2002, \$3,000.

“Providing an Understanding of Telecommunications Technology By Incorporating Multimedia into Economics 235,” Instructional Technology Development Grant (peer-reviewed), January 15, 2001, \$1,400.

“Using Real Presenter to create a virtual tour of GTE’s Central Office,” with Jack Chizmar, Instructional Technology Literacy Mentoring Project Grant (peer-reviewed), January 15, 2001, \$1,000.

“An Empirical Study of Telecommunications Industry Forecasting Practices,” with James E. Cox, College of Business University Research Grant (peer-reviewed), Summer, 1999, \$6,000.

“Ownership Form and the Efficiency of Electric Utilities: A Meta-Analytic Review” with L. Dean Hiebert, Institute for Regulatory Policy Studies research grant (peer-reviewed), August 1998, \$6,000.

Total Grants: \$2,481,661

